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10/681,339	10/09/2003	Stefan R. Hlibowicki	API-P007	8813

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EXAMINER	
MONIKANG, GEORGE C	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## *Office Action Summary*	**Application No.** 10/681,339	**Applicant(s)** HLIBOWICKI, STEFAN R.	
	Examiner George C. Monikang	**Art Unit** 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *3/18/2005, 1/9/2004*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 11/12/2007, with respect to the rejection(s) of claim(s) 1-30 under 10/681,339 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Nagel, US Patent 4,220,832.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 4, 6, 9-12, 14, 16, 20-23, 25, 27 & 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (hereinafter referred to as AAPA, figs. 1-3b; background; paras 0038-0054), in view of Nagel, US Patent 4,220,832. (The Nagel reference is cited in IDS filed 3/18/2005)

Re Claim 1, AAPA discloses a switching split voice coil of a speaker (*fig. 1; para 0038*), the split voice coil having a first coil and a second coil located in a magnetic field (*paras 0038-0039*), the first coil and the second coil being wired such that current can be provided to one coil without providing current to the other coil (*para 0044*), the power amplifier comprising: a) a first branch for providing a first audio current to the first coil (*fig. 1*); b) a second branch for providing a second audio current to the second coil (*fig. 1*), wherein the first audio current differs from the second audio current (*para 0044*), transferring energy between the first branch and the second branch such that both the first audio current and the second audio current constructively contribute to a force provided to the voice coil (*para 0044*); but fails to disclose a transformer for transferring the energy and a power amplifier for connection to the split voice coils. However, Nagel does (*abstract*).

Taking the combined teachings of AAPA and Nagel as a whole, one skilled in the art would have found it obvious to modify the a switching split voice coil of a speaker (*fig. 1; para 0038*), the split voice coil having a first coil and a second coil located in a magnetic field (*paras 0038-0039*), the first coil and the second coil being wired such that current can be provided to one coil without providing current to the other coil (*para 0044*), the power amplifier comprising: a) a first branch for providing a first audio current to the first coil (*fig. 1*); b) a second branch for providing a second audio current to the second coil (*fig. 1*), wherein the first audio current differs from the second audio current (*para 0044*), transferring energy between the first branch and the second branch such that both the first audio current and the second audio current constructively contribute to a force provided to the voice coil (*para 0044*) of AAPA with c) a transformer for transferring the energy and a power amplifier for connection to the split voice coils as taught in Nagel (*abstract*) to provide an alternating force in the speaker.

Re Claim 2, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 1 wherein: the first branch comprises a first switching element for controlling a first current in the first branch (*AAPA, fig. 1; para 0038*); the second branch comprises a second switching element for controlling a second current in the second branch (*AAPA, fig. 1; para 0038*), wherein the first current and the second current have a selected high frequency period (*Nagel, abstract*), the first audio current is the average of the first current over the high frequency period (*Nagel, abstract*), and the second audio current is the average of the second current over the high frequency period (*Nagel, abstract*).

Re Claim 4, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 2 wherein the transformer is one of a high frequency transformer and an impulse transformer (*Nagel, abstract*).

Re Claim 6, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 2 wherein the first audio current is provided concurrently with the second audio current (*AAPA, para 0044*), and the first current and the second current are alternately supplied to the first branch (*AAPA, para 0044*) and the second branch respectively such that the second current is interrupted when the first current is supplied to the first branch (*AAPA, para 0044*), and the first current is interrupted when the second current is supplied to the second branch (AAPA, para 0044).

Re Claim 9, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 2 further comprising a power supply connection means for providing power to the first coil and the second coil (*AAPA, figs. 1-3b*); and, a signal input branch for receiving an input signal providing audio information to the speaker (*AAPA, figs. 1-3b*); and at least one signal circuit for dividing the input signal to provide the first signal and the second signal (*AAPA, figs. 1-3b: 116 & 140; para 0038: signal is split between the coils*).

Claim 10 has been analyzed and rejected according to claim 1.

Claim 11 has been analyzed and rejected according to claim 2.

Re Claim 12, the combined teachings of AAPA and Nagel disclose the method as defined in claim 11 further comprising transferring energy between the first branch and the second branch to make both the first current and the second current bi-directional (*AAPA, fig. 1; para 0038*).

Claim 14 has been analyzed and rejected according to claim 4.

Claim 16 has been analyzed and rejected according to claim 6.

Claim 20 has been analyzed and rejected according to claim 9.

Re Claim 21, the combined teachings of AAPA and Nagel disclose the method as defined in claim 11 wherein the first current and the second current are selected to be substantially inaudible when provided to the first coil and the second coil to impede sound distortion (*AAPA, para 0038: the current is inaudible till it goes through the coils and drives the speaker*).

Claim 22 has been analyzed and rejected according to claim 1.

Claim 23 has been analyzed and rejected according to claim 2.

Claim 25 has been analyzed and rejected according to claim 4.

Claim 27 has been analyzed and rejected according to claim 6.

Claim 30 has been analyzed and rejected according to claim 9.

Claims 3, 5, 13, 15, 24 & 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (hereinafter referred to as AAPA, figs. 1-3b; background; paras 0038-0054) and Nagel, US Patent 4,220,832 in view of Kukurudza, US Patent 5,917,922.

Re Claim 3, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 2, but fails to disclose wherein the transformer comprises a first winding in the first branch and a second winding in the second branch (*Kukurudza, fig. 1*), the first winding having a first terminal for receiving current flowing from the first branch and the second winding having a second terminal for receiving current flowing from the second branch (*Kukurudza, fig. 1*), the first winding in the first branch and the second winding in the second branch being oriented such that the first terminal and the second terminal are of opposite polarity (*Kukurudza, fig. 1*). However, Kukurudza does.

Taking the combined teachings of AAPA, Nagel and Kukurudza as a whole, one skilled in the art would found it obvious to modify the switching power amplifier of AAPA and Nagel with wherein the transformer comprises a first winding in the first branch and a second winding in the second branch (*Kukurudza, fig. 1*), the first winding having a first terminal for receiving current flowing from the first branch and the second winding having a second terminal for receiving current flowing from the second branch (*Kukurudza, fig. 1*), the first winding in the first branch and the second winding in the second branch being oriented such that the first terminal and the second terminal are of opposite polarity (*Kukurudza, fig. 1*) as taught in Kukurudza to simplify the control of the power devices.

Re Claim 5, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 2, but fail to disclose further comprising a first filtering capacitor for filtering high frequency components from the first current, the first filtering capacitor being connected to the first branch (*Kukurudza, fig. 1: C1*); and, a second filtering capacitor for filtering high frequency fluctuations from the second current, the second filtering capacitor being connected to the second branch (*Kukurudza, fig. 1: C2*). However, Kukurudza does.

Taking the combined teachings of AAPA, Nagel and Kukurudza as a whole, one skilled in the art would have found it obvious to modify the switching power amplifier of AAPA and Nagel with further comprising a first filtering capacitor for filtering high frequency components from the first current, the first filtering capacitor being connected to the first branch (*Kukurudza, fig. 1: C1*); and, a second filtering capacitor for filtering high frequency fluctuations from the second current, the second filtering capacitor being connected to the second branch (*Kukurudza, fig. 1: C2*) as taught in Kukurudza to simplify the control of the power devices.

Claim 13 has been analyzed and rejected according to claim 3.

Claim 15 has been analyzed and rejected according to claim 5.

Claim 24 has been analyzed and rejected according to claim 3.

Claim 26 has been analyzed and rejected according to claim 5.

Claims 7, 17-18 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (hereinafter referred to as AAPA, figs. 1-3b; background; paras 0038-0054) and Nagel, US Patent 4,220,832 as applied to claim 6, in view of Kukurudza, US Patent 5,917,922, and further in view of Thrap, US Patent 6,912,136 B2.

Re Claim 7, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 6, but fail to disclose further comprising the first winding having a first terminal connected to the first switching element (*Kukurudza, abstract; fig. 1: transformer*) and the second winding having a second terminal connected to the second switching element (*Kukurudza, abstract; fig. 1: transformer*); the second terminal being opposite in polarity to the first terminal (*Kukurudza, fig. 1: 12 & 14*). The combined teachings of AAPA, Nagel and Kukurudza fail to disclose wherein the transformer is a substantially 1:1 transformer (*Thrap, col. 10, lines 29-31*), switching means for controlling (i) the first switching element to terminate the first current at a variable first threshold magnitude at the end of a first time interval in each high frequency period (*Thrap, abstract; fig. 1*), (ii) the second switching element to terminate the second current at a variable second current termination magnitude at the end of a second time interval in each high frequency (*Thrap, abstract; fig. 1*); such that the transformer is operable to transfer energy from the first branch to the second branch during of the first interval to commence the second current at the associated first threshold magnitude (*Thrap, abstract; fig. 1*), and from the second branch to the first branch during the second interval to commence the first current at the associated second threshold magnitude (*Thrap, abstract; fig. 1*). However, Thrap does.

Taking the combined teachings of AAPA, Nagel, Kukurudza and Thrap as a whole, one skilled in the art would have found it obvious to modify the switching power amplifier of AAPA and Nagel with first winding having a first terminal connected to the first switching element (*Kukurudza, abstract; fig. 1: transformer*) and the second winding having a second terminal connected to the second switching element (*Kukurudza, abstract; fig. 1: transformer*); the second terminal being opposite in polarity to the first terminal (*Kukurudza, fig. 1: 12 & 14*) of Kukurudza with wherein the transformer is a substantially 1:1 transformer (*Thrap, col. 10, lines 29-31*), switching means for controlling (i) the first switching element to terminate the first current at a variable first threshold magnitude at the end of a first time interval in each high frequency period (*Thrap, abstract; fig. 1; col. 8, lines 51-53*), (ii) the second switching element to terminate the second current at a variable second current termination magnitude at the end of a second time interval in each high frequency (*Thrap, abstract; fig. 1; col. 8, lines*

51-53); such that the transformer is operable to transfer energy from the first branch to the second branch during of the first interval to commence the second current at the associated first threshold magnitude (*Thrap, abstract; fig. 1*), and from the second branch to the first branch during the second interval to commence the first current at the associated second threshold magnitude (*Thrap, abstract; fig. 1*) as taught in Thrap to simplify the control of the power devices and provide alternating force in the speaker.

Claims 17-18 have been analyzed and rejected according to claim 7.

Claim 28 has been analyzed and rejected according to claim 7.

Claims 8, 19 & 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (hereinafter referred to as AAPA, figs. 1-3b; background; paras 0038-0054) and Nagel, US Patent 4,220,832, as applied to claim 6, and further in view of Thrap, US Patent 6,912,136 B2.

Re Claim 8, the combined teachings of AAPA and Nagel disclose the switching power amplifier as defined in claim 6 where the current is audio (*AAPA, para 0038: speaker*) but fails to disclose wherein the switching means is operable to control the variable first threshold magnitude and the variable second threshold magnitude from high frequency period to high frequency period to control the first current and the second current. However, Thrap does (*abstract; fig. 1; col. 8, lines 51-53*).

Taking the combined teachings of AAPA, Nagel and Thrap as a whole, one skilled in the art would have found it obvious to modify the switching power amplifier as defined in claim 6 where the current is audio (*AAPA, para 0038: speaker*) of AAPA and

Nagel with wherein the switching means is operable to control the variable first threshold magnitude and the variable second threshold magnitude from high frequency period to high frequency period to control the first current and the second current as taught in Thrap (*abstract; fig. 1; col. 8, lines 51-53*) to provide alternating force in the speaker.

Claim 19 has been analyzed and rejected according to claim 8.

Claim 29 has been analyzed and rejected according to claim 8.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Monikang whose telephone number is 571-270-1190. The examiner can normally be reached on M-F. alt Fri. Off 7:30am-5:00pm (est).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

George Monikang

2/4/2008

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